Delicious & precious.

Using a cloud-based IoT platform, a monitoring sensor system from the Telekom Hub:Raum-sponsored start-up BeeAnd.me protects bee colonies from disease outbreaks and thus secures honey harvests for beekeepers and consumers – with a not insignificant multiplicative effect; worldwide pollination by bees is valued at hundreds of billions of euros in agricultural and food industries.

Photo: dpa/picture alliance/Patrick Pleul

COPY —— Thomas van Zütphen

Whether used as a spread, to sweeten beverages, or to refine foods – honey is considered both delicious and healthy all over the world. Its production relies less on people and their machines, but rather is the result of hard work by honey bees. These small creatures collectively fly up to 75,000 miles – about three times around the world – and visit five million flowers to produce just one kilo of honey. This is how beekeepers worldwide achieve an average annual harvest of 1.3 million tons in a highly sensitive market with a volume of between 12 and 14 billion euros – just a tiny niche in the global food market. Not to mention the natural remedies industry. Small. Delicious. Precious.

Because no matter on which continent – the threats to honey bees and numerous other beneficial insects has increased significantly in recent years. As a result, the "pollination beekeeping" business is booming: entire bee colonies are contracted out to fruit growers and orchard owners and transported from field to field.

To help beekeepers identify emerging health risks in their hives faster and, above all, before it's too late, the start-up BeeAnd.me, sponsored by the Deutsche Telekom business incubator Hub:Raum, has developed a digital beehive sensor designed to replace regular health checks by humans. A solution that is just as interesting for part-time beekeepers, who make up nearly 99 percent of the "industry" in Germany, as it is for large companies.

ANIMAL WELFARE FROM THE CLOUD

Industrial producers, such as Germany's market leader Fürsten-Reform, with its brands Langnese and Bihophar, operate huge beekeeping facilities in Guatemala, Mexico, and El Salvador. Specifically, the BeeAnd.me system records sounds, weight, humidity, and temperatures using hives scales, microphones, and sensors to monitor the health and activity of the bees on each level, and to analyze the well-being of the hive.

The data is collected and then stored in the Open Telekom Cloud. To keep the amount of data to a minimum (smart data), it is only transmitted when an IoT platform in the cloud detects patterns or recurring anomalies. Not least for this reason, the system and its rechargeable batteries, with a two-year data transmission lifetime, achieve outstanding energy efficiency and make data accessible to beekeepers from anywhere via the Web, smartphone or tablet.

Just 2 dozen of the more than 500 bee species collect nectar for use beyond their own. But where were the bees especially busy? Do their yields keep honey prices stable or drive them up? Where 500 g jars of honey are frequently available in supermarkets for 4 to 5 euros, certain single-variety products can cost twice as much. One kilo of honey from the madrone costs 18 euros.

A long way: Bees have to cover up to 75,000 miles in flight before a beekeeper can harvest one kilo of honey from their honeycomb.

One kilo of lavender honey is 23 euros. Manuka honey from New Zealand can reach prices of more than 100 euros per jar.

THE "HEAVY-HITTER FOOD PRODUCER"

This is the one side of value creation from beekeeping to honey marketing. The small one. A completely different side – the big side, as it were – looks like this: Around 80 percent of the up to 3,000 agricultural and wild plants native to Germany alone depend on honey bees as pollinators. Accordingly, more than 85 percent of agricultural yields from crop and orchard cultivation depend on bees as pollinators.

According to the nature conservation initiative beecareful, the economic benefits of pollination by bees reached a value of 265 billion euros globally in 2015.

According to other sources, such as the German nature conservation association NABU, the value is estimated to be nearly twice as much. Almost half a quadrillion euros. This is why bees – in addition to swine and cattle – are considered to be one of the most important farm animals in the world, indispensable for our entire terrestrial ecosystem, and, in critical areas, essential for global food production.

When, in May of this year, as part of a joint campaign with NABU and the Lower Saxony Ministry for the Environment, the retail group PENNY removed all products from the shelves of one of its stores in Hanover that would no longer exist without bees, most customers visiting the store in the Langenhagen district were initially speechless: coffee, kiwis, cherries? Gone. Frozen pizza, chocolate, skin care creams, and deodorants – all products that contain canola, olive, or sunflower oils were "out". Around 60 percent of the 2,500 various common products one store carries were not available. Almost two-thirds of the shelves were empty. Even PENNY COO Stefan Magel was affected: "I was shocked when I saw the list. It's very hard to imagine."

1 kg
honey from the madrone
18 €

1 kg
lavender honey
23 €

Manuka honey from New Zeeland costs
100 €
per jar

For more material on this topic, visit:

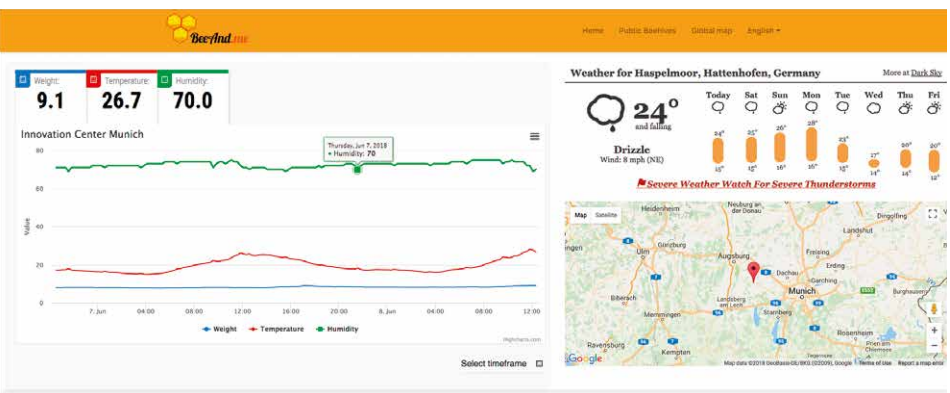
LIKE A BABY MONITOR FOR BEES

Is a hive not gaining any weight over a number of hours? Is the number of flight movements decreasing significantly? Is the temperature in the brood nest rising to heights that are dangerous for offspring? BeeAnd.me alerts beekeepers using predictive analytics to react to unwanted events in a timely and targeted manner, much like a baby monitor for bees. "The fact that beekeepers are alerted in this way to any potential indicators of disease in their colonies very early on allows them to take anticipatory, targeted action to prevent the potential loss of an entire colony," explains Patrick Köhler. The innovation manager of T-Systems is the project owner of the Digital Beehive and is responsible at T-Systems' Munich Innovation Center and the Telekom Group headquarters in Bonn for the construction of two functional exhibits with, currently, twelve real hives that will be presented to customers.

While the Telekom partner Microtronics provides hardware, software, and defined interfaces for data transmission, "the cloud-based system evaluates and analyzes the data," says Köhler. "Health analysis and sound pattern evaluation, that is, data mining and machine learning, are core areas of expertise at BeeAnd.me." In addition to accurately measuring the quantities of honey produced, the system also allows beekeepers to determine when the entire hive is completely inside the digital beehive, to specifically apply beekeeping treatment concepts, such as mite prophylaxis, and to sustainably manage the health care of the bees.

Environmental conservation and animal welfare supported by IoT and the cloud, sensors, data and networks, honeybee hive welfare, and the sustainability strategy practices throughout the entire Rewe Group: PENNY's "Silent Spring" campaign in its Hanover supermarket certainly contributed to raising awareness of these important topics. To the same end, Dr. Gerlind Lehmann, Professor for Evolutionary Ecology at the Humboldt University of Berlin, is already developing "a nationwide and uniform insect monitoring program, which will allow us to quickly develop strategies to halt and reverse the trend of declining biodiversity among our insects." A goal to which the Digital Hive can contribute.

Patrick.Koehler@t-systems.com
new.beeand.me
www.t-systems.com/telekom/smart-beehives



Photos: Patrick Köhler/T-Systems; Strapline: BeeAnd.me